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Taxonomic Notes on *Ophiopogon* (Convallariaceae) of East Asia (III)

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Ophiopogon intermedius D.Don and six other species of the same genus occurring in East Asia are taxonomically reinvestigated. As a result, *O. aciformis* F.T.Wang & Ts.Tang ex H.Li & Y.P.Yang*, *O. bodinieri* H.Lév., *O. filiformis* H.Lév., *O. formosanus* Ohwi* and *O. scaber* Ohwi are treated as conspecific with *O. intermedius* (new synonyms are asterisked). *Ophiopogon planiscapus* Nakai distributed in Japan is regarded as very closely allied to *O. intermedius*. It is noteworthy that a stoloniferous form of *O. intermedius* distributed in Yunnan, China, particularly closely resembles *O. planiscapus*.
(Continued from J. Jpn. Bot. **76**: 151–165, 2001)

Key words: East Asia, *Ophiopogon intermedius, Ophiopogon planiscapus*, taxonomy

4) *Ophiopogon intermedius* and identity of *O. aciformis*, *O. bodinieri*, *O. filiformis*, *O. formosanus*, *O. scaber* and *O. planiscapus*

Ophiopogon intermedius described by Don (1825) from Nepal is widely distributed in Asia (Dai and Chen 1978, Hara 1978, Tanaka 2000). The result of my taxonomic survey on this species ocurring in Southern Asia was reported in a previous paper (Tanaka 2000). In East Asia, there are also some other species that appear to be closely related to *O. intermedius*. In this paper these species are reviewed in connection with the taxonomy of *O. intermedius*.

Ophiopogon aciformis F.T.Wang & Ts.Tang ex H.Li & Y.P.Yang (Fig. 1) was described by Yang and Li (1990b) from southwestern Yunnan, China. According to them, this species is proximate to *O. intermedius*, but differs from it in having flowers fascicled in 2 or 3 in the axils of bracts, linear-lanceolate bracts, a thick conoidal style, and linear leaves which are long-acuminate at the apex. Meanwhile, *O. longifolius* Decne., which is distributed in southeast Asia (Tanaka 1998), also often has a thick conoidal style. As the style of *O. aciformis* described is similar to that of *O. longifolius*, I noted previously (Tanaka 1998) that the two species may be conspecific or closely allied to each other. But, no authentic specimen of *O. aciformis* was available when I made this remark. In the present survey I had an opportunity to examine an isotype of *O. aciformis* (C. W. Wang 78041, PE) and a specimen assignable to it [Y. H. Li s.n. from Jiang-Cheng Hsien, Yunnan, KUN 0305009. Another sheet by Y. H. Li (s.n., YNTBI–cf. Yang and Li 1990a) from Jiang-Cheng is identified by Yang and Li (1990a) as *O. aciformis*]. The following facts were unveiled from these specimens. The roots of *O. aciformis* (Y. H. Li s.n., KUN) are ca.1.5 mm in diameter or less, and very similar in thickness and form to those of *O.*

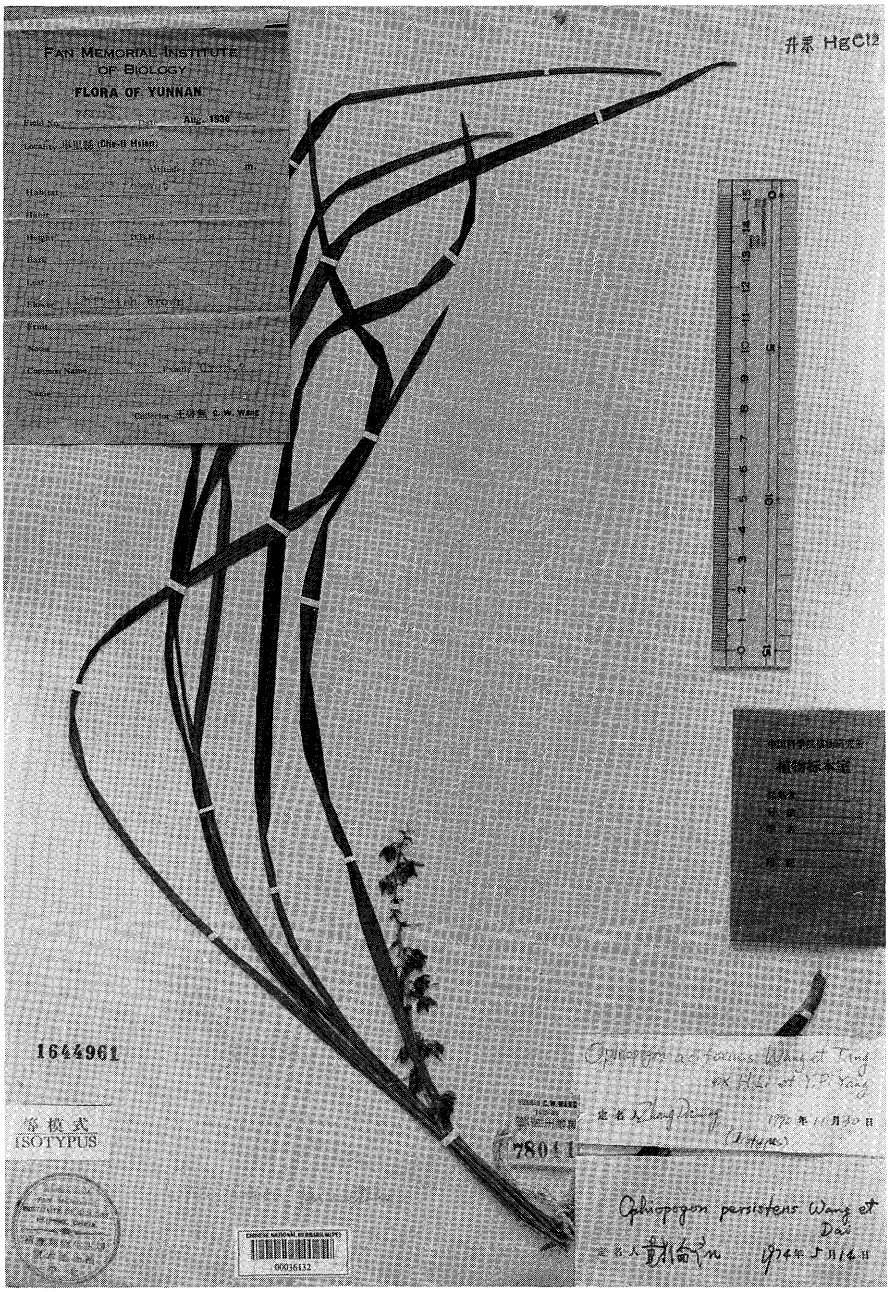

Fig. 1. Isotype of *Ophiopogon aciformis* (Che-li Hsien, Yunnan, China, C. W. Wang 78041, PE). This specimen lacks the peduncle of the inflorecence.

intermedius, but dissimilar to those of *O. longifolius* which are thicker, reaching 4 mm in diameter (Tanaka 1998). The styles of *O. aciformis* are subulate, 3.7–4.1 mm long and (0.2–) 0.3–0.5 mm wide at the base (in sicco), and not significantly different in form

and size from those of *O. intermedius* (in some specimens of *O. intermedius* from China, the styles are subulate to filiform, and 3–5.8 mm long and 0.3–0.5 mm wide at the base). The leaves of the specimens of *O. aciformis* are linear and attenuate to both ends (Fig. 1), and papery, like many specimens of *O. intermedius*. Two or three flowers are fascicled in some axils of the bracts of *O. aciformis*, as reported by Yang and Li (1990b), but this feature is also common in *O. intermedius* (e.g., E. E. Maire 1859 from Yunnan, K). The proportion of inflorescence to scape (incl. the rachis of the inflorescence) in *O. aciformis* is relatively small (ca.1/4.6 in Y. H. Li s.n., KUN). This feature is also shared by *O. intermedius* (ca.1/3–1/23 in specimens from China). There is no significant difference in flowers, bracts and other characters between the specimens of *O. aciformis* and *O. intermedius*. As far as the material at hand is concerned, *O. aciformis* is considered as conspecific with *O. intermedius*. *Ophiopogon intermedius* here circumscribed differs from *O. longifolius* by the more slender roots and the inflorescence usually sharing a smaller proportion of the scape (cf. Tanaka 1998, for *O. longifolius*).

Léveillé (1905) described *Ophiopogon bodinieri* (Fig. 2) from Guizhou, China. As having stolons, this species was treated as distinct from *O. intermedius* by Dai and Chen (1978). But, in other respects (flowers, scapes, leaves and roots) these two species seem not to differ so markedly. In the specimens assignable to *O. bodinieri*, the roots are very slender (less than ca.1.5 mm in diameter) and ramose, the styles are subulate, the scapes are slender (usually less than 1.5 mm wide), the proportion of inflorescence to scape is small (ca.1/3–1/16.5), and the leaves are thin-textured and narrow (to 4.5 mm wide). Similar features are also possessed by *O. intermedius*. In the latter, the roots are often less than 1.5 mm in diameter, the scapes are usually less than 2.5 mm wide, the proportion of inflorescence to scape is ca.1/3–1/23, and the leaves are usually up to ca.9 mm wide (these data are obtained from specimens from China). *Ophiopogon bodinieri* seems not specifically distinct from *O. intermedius* (Tanaka 2000). McKean (1986) also treated them as conspecific.

Ophiopogon filiformis (Fig. 3) described by Léveillé (1915) from Yunnan seems also not to differ significantly from *O. intermedius*. I agree with McKean (1986) who reduced it to *O. intermedius*. Dai and Chen (1978) treated *O. filiformis* as conspecific with *O. bodinieri*.

Ophiopogon formosanus (Fig. 4) was described by Ohwi (1934, 1943). The form corresponding to this species is widely ditributed in Taiwan (Taipei, Hsinchu, Ilan, Hualien, Nantou, Chiayi, Kaohsiung, Pingtung and Taitung). *Ophiopogon formosanus* has slender creeping stolons like *O. bodinieri* and as a whole closely resembles it. At the same time, *O. formosanus* is also quite similar to *O. intermedius* in many respects. The specimens assignable to *O. formosanus* have slender, ramose roots which are usually less than 1 mm in diameter, a subulate style, flaccid and narrow leaves (1.5–5 mm wide), slender scapes less than 2 mm wide, and an inflorescence sharing a small proportion of the scape (ca.1/3–1/23.5). Dai and Chen (1978) reduced *O. formosanus* to *O. bodinieri*. In my observation, *O. formosanus* falls within the range of variation of *O. intermedius*.

Ophiopogon scaber was also described by Ohwi (1934, 1943) from Taiwan. The form corresponding to this species occurs in the high altitudes of Taiwan [e.g., Mt. Alishan, alt. 2500 m, U. Faurie 1183, holotype, KYO (Fig. 5); Mt. Nanhutashan, alt. 2800 m, H. Shimada 1341, TI; Kanzan-goe (Mt. Kuanshan), Jul. 25, 1938, S. Okamoto s.n., KYO; Mt. Peitawushan, alt. 2000–3090 m, T. Namba et al. 943, TI; Mt. Chilaichushan, Y. Shimada 5099-B, KYO]. As in *O.*

Fig. 2. Lectotype of *Ophiopogon bodinieri* (Kouy-Tchéou, Chine, E. Bodinier 1667, E).

formosanus (= *O. intermedius*; Fig. 4), the roots of *O. scaber* are slender and less than ca.1.5 mm in diameter, the scapes are also slender (less than ca.2 mm wide), and the leaves are narrow (to ca.3.5 mm wide) and papery. In Taiwan the typical form of *O.*

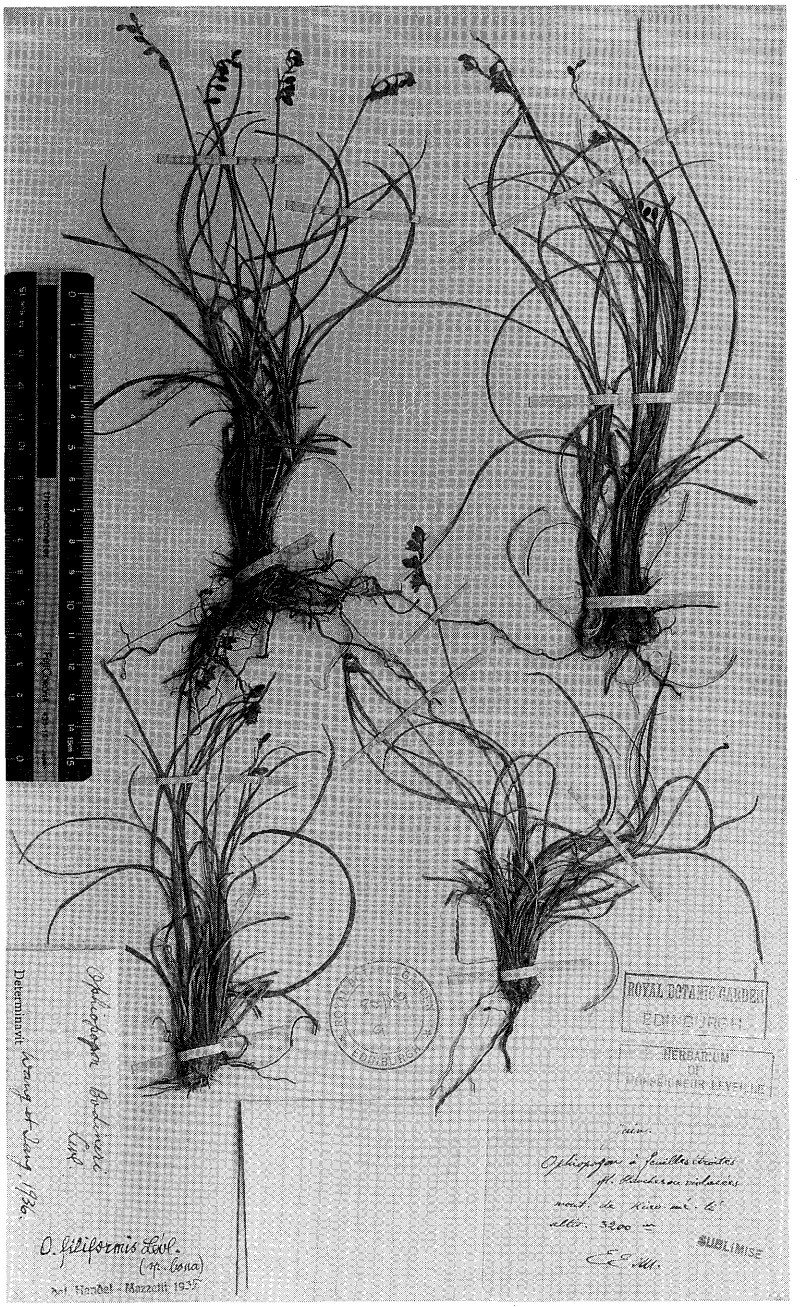

Fig. 3. Holotype of *Ophiopogon filiformis* (Yunnan, Chine, E. E. Maire s.n., E).

scaber appears distinguishable from *O. formosanus* by its small flowers (perianth lobes ca.2.5–3.5 mm long, anthers 1.4–1.8 mm long, and styles 2.5–3.5 mm long; see also Ohwi 1934) and scapes with finely serrulate edges. However, in some other re-

Fig. 4. Holotype of *Ophiopogon formosanus* (Nôkô-goe, Formosa, J. Ohwi 3013, KYO).

gions outside Taiwan some specimens of *O. intermedius* that closely resemble *O. scaber* are collected (Bhutan, H. J. Noltie 12, E; Sikkim, D. G. Long & al. 949, E; Assam, Khasi Hills, T. R. Chand 7100, 7102, L; southern India, Nilglimis, Schmidt 31, BM; Philippines, Apr.–Jun. 1918, J. K. Santos s.n., Bureau of Sci. 32070, L-0245190).

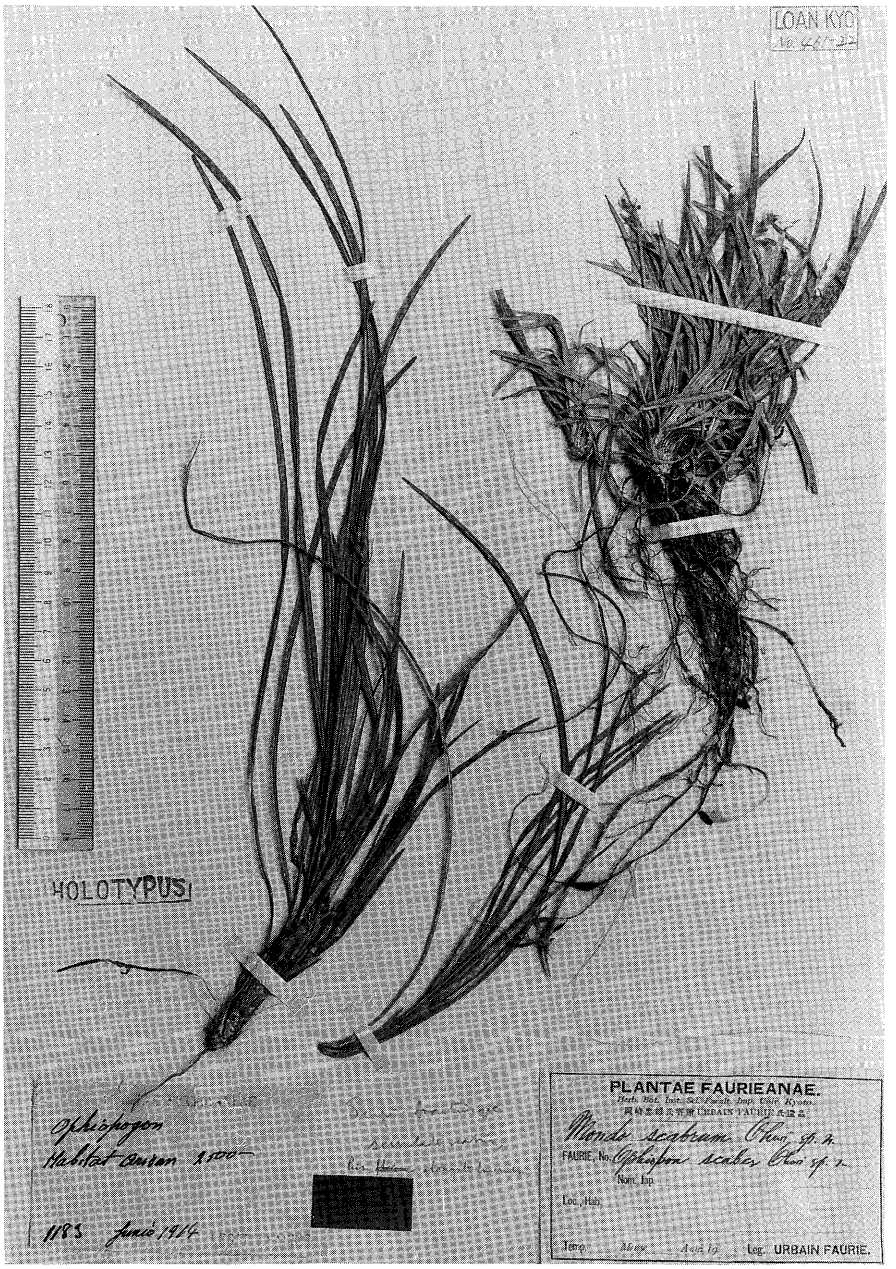

Fig. 5. Holotype of *Ophiopogon scaber* (Mt. Arisan, Formosa, U. Faurie 1183 ex pte, KYO). The rightmost individual is excluded from the type designation.

Their flowers are very similar in form and size to those of *O. scaber*. The scapes of a specimen by Santos (s. n., L-0245190) from the Philippines (cited above) are also somewhat serrulate on the edges. Some other specimens of *O. intermedius* from outside Taiwan have also scapes with somewhat serrulate edges (e.g., Nepal, Nov. 19, 1982,

H. Salzen s.n., cult. in Bot. Gard. Edinburgh, then in Teikyo Univ., Jun. 25, 1995, Herb. Teikyo Univ.; Yunnan, J. Murata, H. Murata & S. K. Wu 1150, MAK; Guizhou, Bi-Jie-Dui 138, PE). Judging from these facts, *O. scaber* seems not to differ distinctly from *O. intermedius*. Dai and Chen (1978) reduced *O. scaber* to *O. intermedius*, and I agree with their treatment.

Ophiopogon planiscapus (Fig. 6) described by Nakai (1920) is distributed in Honshu, Shikoku and Kyushu of Japan (Ohwi 1965). Maximowicz (1870) referred this species to *O. japonicus* (Thunb.) Ker Gawl. var. *wallichianus* (Kunth) Maxim. The latter taxon (= *Flueggea wallichiana* Kunth) has often been treated as conspecific with *O. intermedius* (Hara 1978, Anonymous 1984, Tanaka 2000). Hara (1966) regarded *O. intermedius* as closely allied to *O. planiscapus*. Bailey (1929) noted that the scape of *O. intermedius* [= *Mondo intermedium* (D.Don) L.H.Bailey] is triqetrous, while that of *O. planiscapus* [= *Mondo planiscapum* (Nakai) L.H.Bailey] is plane or flat. In my observation, however, the scapes of *O. intermedius* are also often complanate, and hence the two species appear not to be clearly separated by this character. According to Nakai (1920), *O. planiscapus* differs from *O. intermedius* in the more obtuse leaves, fascicled flowers and plane scapes. But, the flowers of *O. intermedius* are also often fascicled in the axils of bracts, as stated earlier. It seems difficult to find out any good character distinguishing *O. planiscapus* from *O. intermedius*. As already pointed out by Bailey (1929), it is evident that *O. planiscapus* is the far eastern representative of *O. intermedius*.

It is interesting to note that a form of *Ophiopogon intermedius* distributed in Yunnan [e.g., La-kou, E. E. Maire s.n., E (Fig. 7); without precise locality, E. E. Maire 478, BM] bears a striking resemblance to *O. planiscapus*. This form, which is assignable to *O. bodinieri* in the classification system by Dai and Chen (1978), has slender stolons, often obtuse leaves, and flowers very similar in form and size to those of *O. planiscapus*. Its leaves and scapes are, however, often slightly more slender than those of *O. planiscapus*. The results of a comparative survey of this form and *O. planiscapus* will be reported in more detail elsewhere. Making a conclusive remark on the taxonomic status of *O. planiscapus* is postponed.

In the experimental garden of our university, some stocks of *Ophiopogon intermedius* have been gathered from several localities (Taiwan, China, Nepal, Bhutan, India and Thailand). From the observations of these stocks it is clear that the flowers of this species are day-neutral and remain open for several days during anthesis. *Ophiopogon planiscapus* also shows a similar flowering habit. In this respect, both *O. intermedius* and *O. planiscapus* are distinct from *O. japonicus* and its close relatives [i.e., *O. reversus* C.C.Huang and *O. jaburan* (Siebold) Lodd.]. In the latter group of species, the flowering is more or less restricted to the daytime (i.e., diurnal; Tanaka 2001a, 2001b). Besides this, *O. japonicus* and its close relatives differ from *O. intermedius* and *O. planiscapus* by the thicker roots and the ovary which is convex at the apex (cf. Tanaka 2001a, 2001b).

In China there still are some other species that appear to be closely related to *Ophiopogon intermedius*; e.g., *O. megalanthus* F.T.Wang & L.K.Dai in Dai and Chen (1978). Further critical surveys of these species are desirable.

Ophiopogon intermedius D.Don, Prodr. Fl. Nepal. 48 (1825); Anonym., Icon. Cormophyt. Sin. **5**: 528, f.7886 (1976); L.K.Dai & S.C.Chen in F.T.Wang & Ts.Tang, Fl. Reipub. Pop. Sin. **15**: 158 (1978), p.p.; McKean in Notes Roy. Bot. Gard. Edinb. **44**: 189 (1986), p.p.; N.Tanaka in J. Jpn. Bot. **75**: 207 (2000). TYPE:

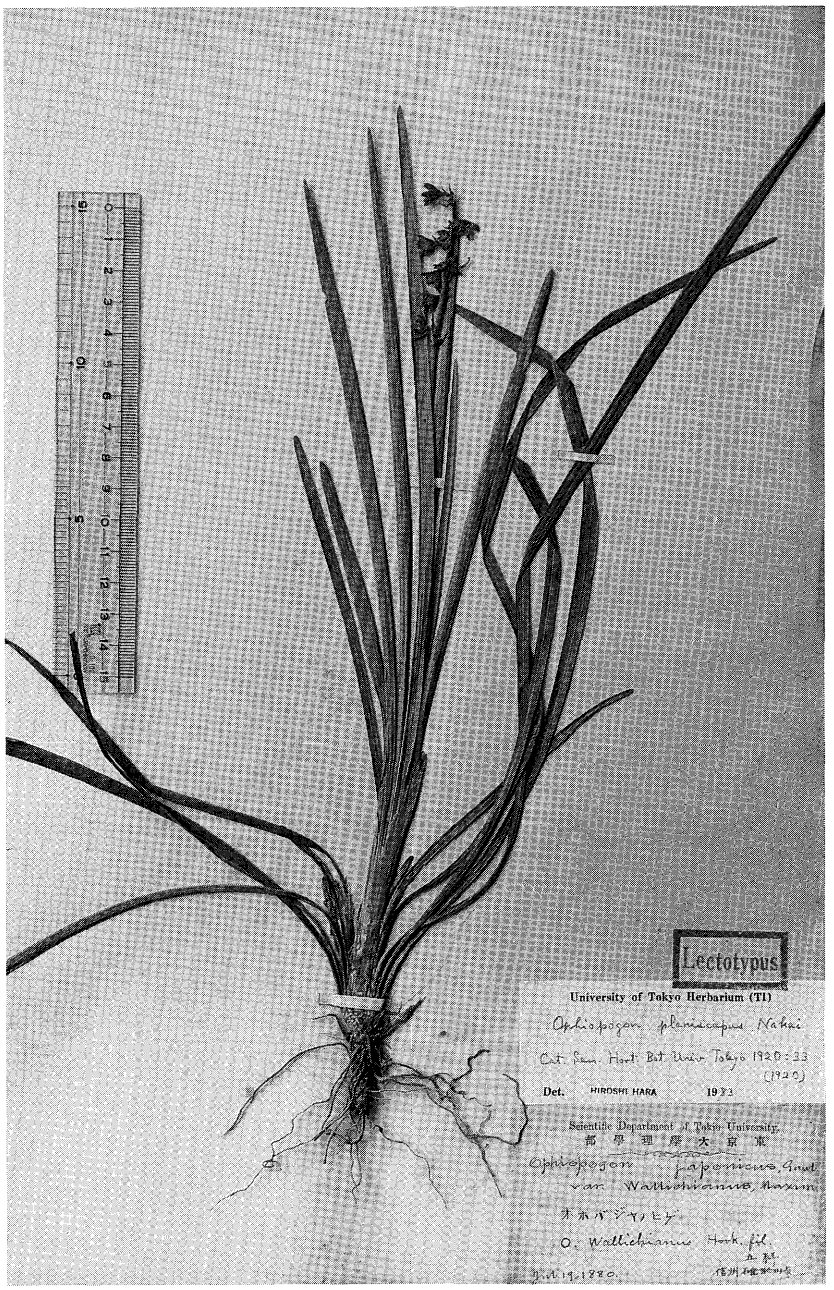

Fig. 6. Lectotype of *Ophiopogon planiscapus* [Usuitôge Pass, Shinshû (Nagano Pref.), Japan, without collector's name, TI]. According to Nakai (1920), the collector is J. Matsumura.

Nepalia. Wallich s.n. [the she et not yet specified. Wallich's specimen 5139-A from Nepal in K (!) may not be the type; cf. N.Tanaka 2000]. [Figs. 1–5, 7]

Fig. 7. Specimen of *Ophiopogon intermedius* (incl. *O. bodinieri*) (La-Kou, Yunnan, E. E. Maire s.n., E). The individuals on this sheet bear a close resemblance to *O. planiscapus* (Fig. 6).

O. japonicus (Thunb.) Ker Gawl. var. *wallichianus* (Kunth) Maxim. in Bull. Acad. Imp. Sci. St. Pétersb. **15**: 89 (1870), p.p.; Anonym., in C.Y.Wu, Index Fl. Yunnan. **2**:

1931 (1984), sub *O. intermedius*; N.Tanaka in J. Jpn. Bot. **75**: 207, sub *O. intermedius*. TYPE: the specimen corresponding to Wallich's Catalogue 5139-B from Silhet in B is holotype, but not extant there now (Tanaka 2000). Its photograph is reproduced in Fig. 11 on p. 20 in Bailey (1929). Another sheet of Wallich 5139-B is in K !.

O. bodinieri H.Lév. in Mem. Acad. Pont. Nuovi Lincei **23**: 343 (1905), p.p., excl. saltem specim. cit. L.Martin & E.Bodinier 1634 (E !); Anonym., Icon. Cormophyt. Sin. **5**: 529, f.7887 (1976); L.K.Dai & S.C.Chen in F.T.Wang & Ts.Tang, Fl. Reipub. Pop. Sin. **15**: 162 (1978); McKean in Notes Roy. Bot. Gard. Edinb. **44**: 189 (1986), pro syn. sub *O. intermedius*; N.Tanaka in J. Jpn. Bot **75**: 208 (2000), sub *O. intermedius*. TYPE: China. Kouy-Tcheou [Guizhou]: Mont. de Lou-tsong-koan, Juill. 12, 1897, E.Bodinier 1667 (lectotype, chosen by H.Hara in 1983, validly designated by McKean 1986, E !).

O. filiformis H.Lév. in Bull. Acad. Géog. Bot. **25**: 25 (1915); L.K.Dai & S.C.Chen in F.T.Wang & Ts.Tang, Fl. Reipub. Pop. Sin. **15**: 162 (1978), pro syn. sub *O. bodinieri*; McKean in Notes Roy. Bot. Gard. Edinb. **44**: 189 (1986), pro syn. sub *O. intermedius*. TYPE: China. Yunnan. Mont. de Kiao-mi-ti, 3200 m, Juin 1912, E. E. Maire s.n. (holotype, E !).

Mondo formosanum Ohwi in Fedde, Repert. Sp. Nov. **36**: 45 (1934). TYPE: cf. *Ophiopogon formosanus* Ohwi.

M. scabrum Ohwi in Fedde, Repert. Sp. Nov. **36**: 46 (1934). TYPE: cf. *Ophiopogon scaber* Ohwi.

Ophiopogon formosanus Ohwi in Fedde, Repert. Sp. Nov. **36**: 45 (1934), pro syn. sub *Mondo formosanum*; in Acta Phytotax. Geobot. **12**: 113 (1943); L.K.Dai & S.C. Chen in F.T.Wang & Ts.Tang, Fl. Reipub. Pop. Sin. **15**: 162 (1978), pro syn. sub *O. bodinieri*; syn nov. TYPE: Formosa. Karen-kô-chô, Nôkô-goe, Jun. 13–15, 1933, J. Ohwi 3013 (holotype, KYO !).

O. scaber Ohwi in Fedde, Repert. Sp. Nov. **36**: 46 (1934), pro syn. sub *Mondo scabrum*; in Acta Phytotax. Geobot. **12**: 113 (1943); L.K.Dai & S.C.Chen in F.T.Wang & Ts.Tang, Fl. Reipub. Pop. Sin. **15**: 158 (1978), pro syn. sub *O. intermedius*. TYPE: Formosa. Mt. Arisan, Jun. 1914, U. Faurie 1183 ex pte. (holotype, KYO !).

O. aciformis F.T.Wang & Ts.Tang ex H.Li & Y.P.Yang in Y.P.Yang and H.Li in Acta Bot. Yunnan. suppl. **3**: 86 (sin. descr. Latin.), 92 (1990); Y.P.Yang in C.Y.Wu, Fl. Yunnan. **7**: 684 (1997); N.Tanaka in J. Jpn. Bot. **73**: 311 (1998), sub *O. longifolius*; syn. nov. TYPE: China. Yunnan. Yinjinghong (Che-li Hsien), alt. 800 m, Aug. 1936, C.W.Wang 78041 (holotype, KUN, not seen; isotype, PE !).

O. japonicus auct. non (Thunb.) Ker Gawl.: Hayata in J. Coll. Sci. Imp. Univ. Tokyo **30**: 355 (1911), quoad specim cit. T. Kawakami & U. Mori 7094; C.Y.Wu, Wild Flow. Yunnan **2**: 254 (photo), 494 (1986), auct. '(L.f.)'.

For other synonymy of *Ophiopogon intermedius* see N. Tanaka (2000).

Description based on the specimens from China and Taiwan:

Glabrous perennial herb. Stem short, with or without stolons. Roots slender, usually less than 1.5 mm in diameter, often bearing fusiform tubers. Leaves basal, tufted, linear, acute or obtuse at apex, papery, serrulate on margins, 10–50 cm long, 1.5–9 mm wide. Scapes slender, ancipital, entire or occasionally serrulate on edges, 9–39 cm long. Inflorescence racemose, 0.5–11.5 cm long, usually under ca.1/3 of entire scape length (to ca.1/34). Flowers 1–3 in each axil of bracts, secund, cernuous. Pedicels 1.7–12 mm long; articulation site variable. Bracts lanceolate to almost linear, scarious, entire or serrulate on margins. Perianth white, mauve or violet. Perianth lobes 6, usually oblong-ovate, 2.5–6.5 mm long, 1.5–2.5 mm wide. Stamens 6. Anthers lanceolate, greenish,

(1.4–) 2.3–3.5 mm long. Filaments very short, 0.2–1 mm long. Pistil 1. Style subulate to filiform, 2.5–5.8 mm long. Ovary inferior. Seeds coated with fleshy testa, ellipsoidal, blue, dark blue, or dull grayish black. Flowers from May to Aug.

Distribution: China, Taiwan, India, Sri Lanka, Bangladesh, Nepal, Bhutan, Myanmar, Thailand, Cambodia, Vietnam, Indonesia (Sumatra, Java) and the Philippines (see also Tanaka 2000). Also recorded from Pakistan and Kashmir (Stewart 1972).

Other representative specimens examined:

CHINA. Xizang. S.Tibet, Natrampa, Chayul Chu, 10500 ft., Jul. 8,1936, fl., F. Ludlow & G. Sherriff 2318 (E).

Yunnan. Mt. Lo-chan, 3200 m, Juin, fl., E. E. Maire s.n. (E); La-kou, 2400 m, Mai, fl., E. E. Maire s.n. (E); Mt. Kin-tchong-chan, 2550–2700 m, Juin, fl., E. E. Maire s.n. (E); vicinity of Yunnan-sen, 1906, fl., E. E. Maire 1859 (K); Tengyueh, 6700 ft., May 1912, fl., G. Forrest 7710 (K); Mengtze, 1895, fl.(buds), W. Hancock 122 (K); Kichan, May 1889, fl., M. Delavay 4366 (P); western Yunnan, fl., McLaren's collectors B-34 (K); Tehching, (Atuntze) Miyetzimu, 3250 m, Jun. 17, 1937, fl., T. T. Yü 8586 (BM); Dali, Butterfly-spring, 1830 m, Aug. 30, 1980, H. Hara & K. Y. Guan 1287 (TI); Yangbi Xian, W side of Diancangshan mount. range, vicinity of Dapingzi, c. 3000 m, Jun. 19, 1984, fl., B. Bartholomew et al. 294 (TI, MAK); Kunming, Chio-tsu-zi, 2200 m, Jun. 7, 1980, fl., H. Hara s.n. (TI); NW Yunnan, 1907, fl., P. Mombeig (K); without precise locality, 1913, fl., E. E. Maire 478 (BM); without precise locality, 1913, fl., E. E. Maire 61 (BM); between Tayao and Yaoan, Jun. 14, 1993, fl., J. Murata, H. Murata & S. K. Wu 1150 (MAK); Zhen-xiong, Bidao-jiao, Jul. 17, 1992, fl., J. Murata & S. Nemoto 1108 (MAK); Dayao, Tanhua Xiang, Mt. Tanhua-shan, 2400–2600 m, Jun. 10, 1993, fl., J. Murata, H. Murata & S. K. Wu 1034 (MAK); Dayao, Tnahua Xiang, Mahuangqin, 2400–2600 m, Jun. 10, 1993, fl., J. Murata, H. Murata & S. K. Wu 1040 (MAK); Dayao, Santai Xiang, Xiao-Baicaoling, Hunshuitan, 3000 m, Jun. 11, 1993, fl., J. Murata, H. Murata & S. K. Wu 1082 (MAK).

Sichuan (Szechuan). Kuan-hsien, 3000–3600 ft., Jul. 13, 1928, fl., W. P. Fang 2166 (K, P); Kuan-hsien, Jul. 6, 1928, fl., W. P. Fang 2047 (K); Atasienlu, Oct. 1938, fl., McLaren's collectors AC-59 (C); SW Szechuan, mountains of Kulu, Muli Territory, 12500 ft., 1932, fl., J. F. Rock 23945 (K); Shih-mien-hsien, 1995, fl.(buds), C. C. Hsieh 40898 (294 ?) (PE 539005); Chengtu, May 16, 1936, fl.(buds), S. S. Chien 5323 (UC 1322732); Thibet oriental, prov. de Moupin, 1869, fl., M. David (P); Chibet oriental, 1893, J. A. Soulie 177 (TNS); Hei-shui-hsien, 2440 m, Jul. 15, 1957, fl., X. Li 73600 (PE).

Guizhou. [Kouy-Tcheou], environs de Kouy-Yang, bois de Kien-lin-chan, Juill. 7, 1898, fl., E. Bodinier 1667 bis (**lectoparatype of *Ophiopogon bodinieri***, E !); Pin-fa, Juin 11, 1903, fl., J. Cavalerie 1061 (2 sheets) (**lectoparatype of *Ophiopogon bodinieri***, E !); environs de Lo-pie (tchen-lin), Juill. 18, 1898, fl., J. Seguin (& E.Bodinier) 2443 (**lectoparatype of *Ophiopogon bodinieri***, E !); Pin-fa, Juin 11, 1903, fl., J. Cavalerie 1052 (E); Gan-chouen, Jul. 1910, fl., J. Cavalerie 3820 (E); Gan-chouen, 1912, fl., J. Cavalerie 8102 (K); without precise locality, 1900–1920, fl., J. Cavalerie 8107 (K); Yinjiang Xian, vicinity of Xiapingsho, W side of Fanjingshan mount. range, 1100–1400 m, Sept. 29, 1986, fr., B. Bartholomew et al. 1767 (TI); Wei-ning-xian, 2500 m, Jul. 4 (10), 1959, fl., Bi-jie-dui 138 (PE).

Guangxi. Without precise locality, Jun. 14, 1928, fl., R. C. Ching 5972 (UC 409857).

TAIWAN. Taipei City & Co. Mt. Rara, Jul. 27, 1918, fl., S. Sasaki s.n. (TNS 145745); Mt. Chihsingshan, Oct. 15, 1987, fr., N. Tanaka s.n. (Herb. Teikyo Univ.); Mt. Tatunshan, Oct. 16, 1987, fr., N. Tanaka s.n. (Herb. Teikyo Univ.).

Hsinchu Co. Taiko (Tahu)-gun, Mogiri-chûzaisho, Jul. 11, 1932, fl., N. Fukuyama 4186 (KYO).

Ilan Co. Taihoku-syû, Ratô-gun, Taiheizan (Taipinshan), Toga-no-o, 7000 ft., Jul. 11, 1933, fl., N. Fukuyama 4188 (KYO); Ratô-gun, Doba-Taiheizan, May 25, 1933, fl.(buds), J. Ohwi 2272 (KYO, TNS 231517); Taihoku-syû, Pianan-anbu, Shikikun, Jun. 8, 1933, fl., J. Ohwi 2914 (KYO, TNS 231519); Yuen-yang Lake Natural Reserve, 1650 m, Jul. 7, 1977, fl., D. E. Boufford (19354) et al. (KYO); Mt. Nanhutashan, 2600 m, Jul. 23, 1963, M. T. Kao 5202 (TAI 107420); Mt. Nanhutashan, 2800 m, late fl., H. Shimada 1341 (TI).

Hualien Co. Karenkô, Sakanobe, Aug. 21, 1929, fl., S. Sasaki s.n. (TNS 145743).

Nantou Co. Mt. Nôkô (Nengkao), Kirai-shuzan (Chilai-chushan), Oct. 1918, Y. Shimada 5099B (KYO); Higashi-Nôkô, May–Aug. 1934, fl., J. L. Gressitt 453 (K); Sakurugammi, 8000 ft., Musha (Wushe) distr., Jul. 9, 1912, fl., W. R. Price 787 (K); Ten-tsu to yin-hai, 2840–2346 m, Aug. 13, 1964, fl., M. T. Kao 5837 (TAI 107419); Alishan to Hoshe, 2000 m, Aug. 21, 1963, fl., M. Tamura, T. Shimizu & M. T. Kao 22269 (TAI 185453); Mt. Niitaka-yama (Yushan), Jul. 1926, fl., S. Sasaki s.n. (TNS 145744); Mt. Rantai (Luantashan), Aug. 9, 1908, fl., T. Kawakami & U.

Mori 7094 (TI) & s.n. (label with no. 664) (UC 345279); Taichû-syû, Syôrei (Sungling), Jul. 1933, fl., N. Fukuyama 4185 (KYO).

Chia-yi Co. Alishan–Minyueh, Nov. 20, 1968, M. Mizushima s.n. (KYO, TI); Mt. Arisan, inter Numanohira et Tâtaka. Aug. 15, 1934, fl., M. Tagawa 366 (KYO); Mt. Arisan, Jul. 1929, fl., N. Fukuyama 4187 (KYO); Mt. Arisan, May 15, 1983, N. Tanaka s.n. (Herb. Teikyo Univ.); Mt. Ali, 2200 m, Oct. 12, 1966, fl., C. G. G. J. van Steenis 20805 (L); Mt. Tôzan (Ta-shan), 2100 m, Jul. 25, 1932, fl., K. Yashiroda (K).

Kaohsiung Co. Takao, Kizan, Rokki (Liukuei), Kanzan (Kuanshan)-goe, Reikan–Hinotani, Jul. 23, 1938, fl., S. Okamoto (2 sheets, KYO); Kanzan-goe, syûkai (county-border), Jul. 25, 1938, fr., S. Okamoto s.n. (KYO); Kizan, Rokki, Daikanzan (Takuanshan), Oct. 8, 1937, fr., S. Okamoto s.n. (KYO).

Pingtung Co. Mt. Daibusan (Tawushan), Hinotani (Kuaiku), 1480–2000 m, Jul. 17, 1968, fl., T. Namba et al. (TI); Mt. Kita-daibusan (Peitawushan), 2000–3090 m, Jul. 19, 1968, fl., T. Namba et al. 943 (TI).

Taitung Co. Kuei-hu, 1600 m, Jul. 29, 1967, C. C. Hsu 3365 (TAI).

NEPAL. Inuka Khola & Lukla, Nov. 19, 1982, H. Salzen s.n., cult. at Edinburgh Bot. Gard. (no. 19830761), then at Teikyo Univ., Jun. 25, 1995, Herb. Teikyo Univ.

BHUTAN. Thimpu distr., Dotena, 2750 m, Jul. 20, 1991, fl., H. J. Noltie 12 (E).

INDIA. Sikkim, north distr., Kabi, N. of Gangtok, Jul. 31, 1992, fl., D. G. Long et al. 949 (E); Assam, Khasi Hills, Mawphlang, ca. 6000 ft., Jul. 8, 1953, fl., T. R. Chand 7100 (L); same locality, Jul. 6–12, 1953, fl., T. R. Chand 7102 (L); southern India, Nilglimis, no date, Schmidt 31 (BM).

PHILIPPINES. Luzon, Pauai, Benguet subprovince, Apr.–Jun. 1918, fl., J. K. Santos s.n., Bureau of Sci. 32070 (L-0245190).

Specimens examined of other species referred to in the text:

Ophiopogon planiscapus: Usui-tôge Pass, Shinshû [Nagano Pref.], Jul. 19, 1880, fl., without collector's name (lectotype, chosen by H. Hara in 1983, TI).

O. megalanthus: Chengkang, Snow Range, 2800 m, Jul. 27, 1938, fl., T. T. Yü 17021 (holotype, PE 325491).

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(For those not listed below see the synonymy list in the text)

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田中教之：**東アジア産ジャノヒゲ属（スズラン科）の分類学的検討（III）**

Ophiopogon intermedius とそれに類似する *O. aciformis*, *O. bodinieri*, *O. filiformis*, *O. formosanus*, *O. scaber*, *O. planiscapus* について分類学的に再検討した．*O. aciformis* は根の太さ，花柱の形態，葉の性質，その他多くの点で *O. intermedius* とよく一致することから，両種を同一種として扱った．*O. bodinieri*, *O. filiformis*, *O. formosanus*, *O. scaber* の4種も，根，葉，花茎，花などにおける形態的類似から，*O. intermedius* と同一種として扱った．この内 *O. bodinieri* については既に McKean（1986）と Tanaka（2000）が，*O. filiformis* については McKean（1986）が，*O. scaber* については Dai and Chen（1978）が，それぞれ *O. intermedius* と同種としている．日本に分布する *O. planiscapus*（オオバジャノヒゲ）もその形態的類似から *O. intermedius* との類縁が極めて高いと考えられる．*O. intermedius* は変異が大きく，*O. planiscapus* との間に顕著な差異を見出すことは難しい．中国雲南省に分布する *O. intermedius* のストロンを持つ一型［Dai and Chen（1978）の分類では *O. bodinieri* に分類される］は，*O. planiscapus* と花の形態などがとくによく類似していることを予報的に述べた．

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